CLAIMS

What is claimed is:

1. A multi-modulation mode air interface frame format comprising:

an overhead portion including a first plurality of time slots;

a plurality of overhead bursts located within respective ones of the first plurality of time slots;

a traffic portion including a second plurality of time slots following the first plurality of time slots; and

a plurality of traffic bursts, wherein respective ones of the plurality of traffic bursts are located within one or more of the second plurality of time slots, wherein each of the plurality of traffic bursts are modulated using a respective one of a plurality of modulation modes.

2. The frame format of Claim 1 wherein said each of said plurality of overhead bursts are modulated using only one of said plurality of modulation modes.

3. The frame format of Claim 2 wherein said each of said plurality of overhead bursts are modulated using quadrature phase shift keying.

4. The frame format of Claim 1 wherein said each of said plurality of traffic bursts comprises one of a plurality of burst types.

5. The frame format of Claim 4 wherein a duration of respective ones of said plurality of traffic bursts comprising respective ones of said plurality of burst types are multiples of each other.

6.   The frame format of Claim 4 wherein said plurality of burst types comprise a single burst type or a quad burst type.

5   7.   The frame format of Claim 6 wherein a duration of said quad burst type is a multiple of a duration of said single burst type.

8.   The frame format of Claim 1 wherein said
10 respective ones of said plurality of traffic bursts using respective ones of said plurality of modulation modes have a duration that is a multiple of one or more of other ones of said plurality of traffic bursts using other respective ones of said plurality of modulation
15 modes.

9.   The frame format of Claim 8 wherein said multiple comprises an integer multiple.

20 10.   The frame format of Claim 1 wherein said plurality of modulation modes comprises quadrature phase shift keying, 16-quadrature amplitude modulation, and 64-quadrature amplitude modulation.

25 11.   The frame format of Claim 10 wherein the duration of a quadrature phase shift keying traffic burst is three times as long as a 64-quadrature amplitude modulation traffic burst and is twice as long as a 16-quadrature amplitude modulation traffic burst.

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12.   The frame format of Claim 1 wherein the durations of said respective ones of said plurality of traffic bursts using said respective ones of said plurality of modulation modes are respective multiples of
35 the duration of a traffic burst modulated by a highest order modulation mode of said plurality of modulation modes.

13. The frame format of Claim 12 wherein said respective multiples comprises respective integer multiples.

5   14. The frame format of Claim 1 wherein said each of said plurality of traffic bursts are capable of carrying signals comprising one of a plurality of transport mode signals.

10   15. The multi-modulation mode air interface frame format of Claim 14 wherein said plurality of transport mode signals comprise synchronous transport mode signals and asynchronous transport mode signals.

15   16. The frame format of Claim 1 further comprising a spare section including a third plurality of time slots in between said first plurality of time slots and said second plurality of time slots.

20   17. The frame format of Claim 1 wherein said plurality of traffic bursts comprises a plurality of differently sized traffic bursts.

          18. A super frame air interface format
25 comprising:
          a plurality of multi-modulation mode air interface frame formats, wherein each of the plurality of multi-modulation air interface frame formats comprises:
          an overhead portion including a first
30 plurality of time slots;
          a plurality of overhead bursts located within respective ones of the first plurality of time slots;
          a traffic portion including a second
35 plurality of time slots following the first plurality of time slots; and

a plurality of traffic bursts, wherein
respective ones of the plurality of traffic bursts are
located within one or more of the second plurality of
time slots, wherein each of the plurality of traffic
5   bursts are modulated using a respective one of a
plurality of modulation modes.

          19.   A multi-transport mode air interface frame
format comprising:
10   an overhead portion including a first
plurality of time slots;
                  a plurality of overhead bursts located
within respective ones of the first plurality of time
slots;
15   a traffic portion including a second
plurality of time slots following the first plurality of
time slots; and
                  a plurality of traffic bursts, wherein
respective ones of the plurality of traffic bursts are
20   located within one or more of the second plurality of
time slots; and
                  a plurality of transport mode signals,
wherein respective ones of plurality of transport mode
signals are contained within respective ones of the
25   plurality of traffic bursts.

          20.   The multi-transport mode air interface
frame format of Claim 19 wherein said plurality of
transport mode signals comprise synchronous signals and
30   asynchronous signals.

          21.   The multi-transport mode air interface
frame format of Claim 19 wherein said plurality of
transport mode signals comprise time division multiplexed
35   signals and asynchronous transfer mode signals.

22. The multi-transport mode air interface frame format of Claim 19 wherein said each of said plurality of traffic bursts is modulated using a respective one of a plurality of modulation modes.

23. The multi-transport mode interface frame format of Claim 22 wherein said plurality of modulation modes comprises quadrature phase shift keying, 16-quadrature amplitude modulation, and 64-quadrature amplitude modulation.

24. A method of transmitting bursts over an air interface comprising:

creating a multi-modulation air interface frame format comprising a plurality of time slots for containing traffic bursts;

formatting traffic signals into the traffic bursts within the multi-modulation air interface frame format;

modulating each of the traffic bursts using a respective one of a plurality of modulation modes on a burst by burst basis; and

transmitting the traffic bursts on the multi-modulation air interface frame format over the air interface.

25. The method of Claim 24 wherein said modulating comprises said modulating said each of said traffic bursts using said one of said plurality of modulation modes, wherein said plurality of modulation modes comprises quadrature phase shift keying, 16-quadrature amplitude modulation, and 64-quadrature amplitude modulation.

26. The method of Claim 24 further comprising:

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formatting overhead signals into overhead bursts within said multi-modulation air interface frame format; and

modulating the overhead bursts on said multi-modulation air interface frame format using only one of said plurality of modulation modes.

27.   The method of Claim 24 wherein said formatting comprises said formatting said traffic signals into said traffic bursts within said multi-modulation air interface frame format, wherein said traffic bursts comprise a plurality of burst types.

28.   The method of Claim 27 wherein said formatting comprises said formatting said traffic signals into said traffic bursts, wherein said traffic bursts comprise quad bursts and single bursts.

29.   The method of Claim 24 wherein said modulating comprises said modulating said each of said traffic bursts using said one of said plurality of modulation modes, wherein respective durations of respective traffic bursts having been modulated by respective ones of said plurality of modulation modes are multiples of the durations of each other.

30.   The method of Claim 24 wherein said modulating comprises said modulating said each of said traffic bursts using said one of said plurality of modulation modes, wherein the durations of respective traffic bursts using respective modulation modes are respective multiples of the duration of a traffic burst modulated by a highest order modulation mode of said plurality of modulation modes.

31.   The method of Claim 24 wherein said formatting comprises formatting said traffic signals into

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said traffic bursts within said multi-modulation air interface frame format, wherein said traffic signals comprise a plurality of transport mode signals.

5   32.   The method of Claim 24 wherein said formatting comprises formatting synchronous traffic signals and asynchronous traffic signals into said traffic bursts within said multi-modulation air interface frame format.

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           33.   The method of Claim 24 wherein said formatting comprises formatting time division multiplexed traffic signals and asynchronous transfer mode traffic signals into said traffic bursts within said multi-

15   modulation air interface frame format.

           34.   The method of Claim 24 wherein said formatting comprises formatting said traffic signals into a differently sized traffic bursts within said multi-

20   modulation air interface frame format.

           35.   A method of transmitting bursts over an air interface comprising:
           creating a multi-transport mode air interface

25   frame format having a plurality of time slots for containing traffic bursts;
           formatting traffic signals into the traffic bursts within the multi-transport mode air interface frame format, wherein the traffic signals comprise a

30   plurality of transport mode traffic signals;
           modulating each of the traffic bursts; and
           transmitting the traffic bursts on the multi-transport mode air interface frame format over the air interface.

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           36.   The method of Claim 35 wherein said formatting comprises formatting said traffic signals into

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said traffic bursts within said multi-transport mode air interface frame format, wherein said traffic signals comprise synchronous traffic signals and asynchronous traffic signals.

37. The method of Claim 35 wherein said formatting comprises formatting said traffic signals into said traffic bursts within said multi-transport mode air interface frame format, wherein said traffic signals comprise time division multiplexed traffic signals and asynchronous transfer mode traffic signals.

38. A method of formatting traffic bursts for an air interface frame format comprising:
formatting signals into traffic bursts;
modulating the traffic bursts using one of a plurality of modulation modes; and
inserting the traffic bursts into time slots on an air interface frame format, wherein the traffic bursts modulated with respective ones of the plurality of modulation modes comprise a different number of the time slots on the air interface frame format.

39. The method of Claim 38 wherein said inserting comprises inserting said traffic bursts into said time slots on said air interface frame format, wherein a respective traffic burst using a highest order modulation mode of said plurality of modulation modes has a duration of one or more time slots, wherein respective traffic bursts using remaining ones of said plurality of modulation modes have a duration that is a multiple of the one or more time slots.

40. A traffic burst for a burst mode communications link comprising:
a preamble portion comprising:
a first unique word;

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a second unique word; and

a data/spare section in between the first unique word and the second unique word, wherein the data/spare section defines a preamble split length; and

5 a data portion following the preamble portion, wherein the data portion contains data.

41. The traffic burst of Claim 40 further comprising:

10 a post amble portion following said data portion, wherein said post amble includes a parity.

42. The traffic burst of Claim 40 further comprising:

15 a guard preceding said first unique word; and

a ramp preceding said first unique word and next to the guard.

43. The traffic burst of Claim 40 wherein said

20 first unique word is less than 16 symbols in length.

44. The traffic burst of Claim 43 wherein said second unique word is less than 16 symbols in length.

25 45. A method of formatting a traffic burst for a burst mode communications link comprising:

creating a preamble comprising a first unique word, a second unique word, and a data/spare section in between the first unique word and the second unique word,

30 wherein the length of symbols between the first unique word and the second unique word defines a preamble split length;

creating a data portion;

placing data into the data portion; and

35 placing data into the data/spare section of the preamble.

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